

Figure 1A  
Identification of Functional Allele Families:  
Motivation

◆ Repetitive Gene Systems

- Repetitive Biochemical Functions
- E.g. systems 1, 7

◆ Both systems must be inactivated before problems

- E.g. ( (1A<sub>2</sub> or 1B<sub>3</sub>) and (7A<sub>3</sub> or 7C<sub>1</sub>) )
- Automatic choice of allele combinations required

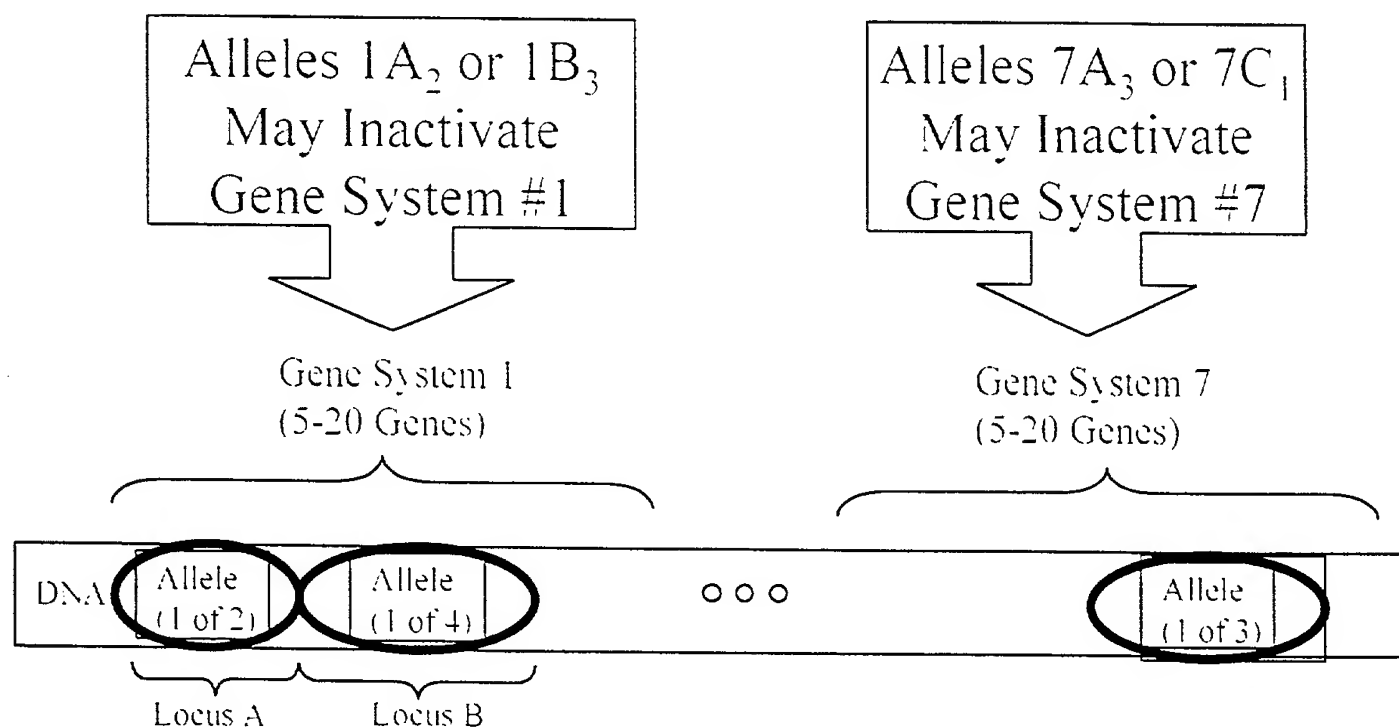


Figure 1B  
Method of Identifying Clinically Relevant  
Allele Combinations

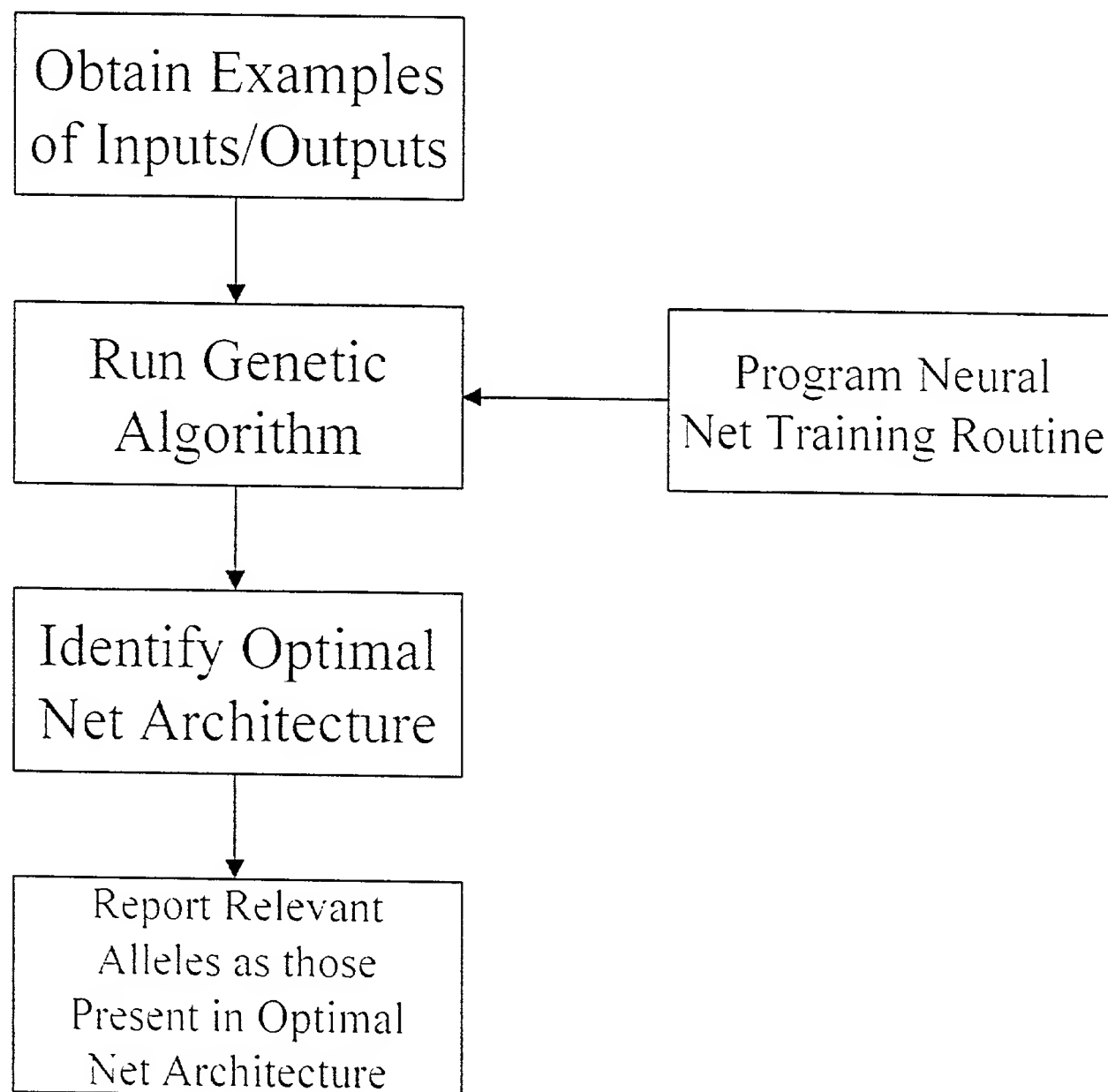


Figure 1C  
Structure of Neural Network  
Training Routine

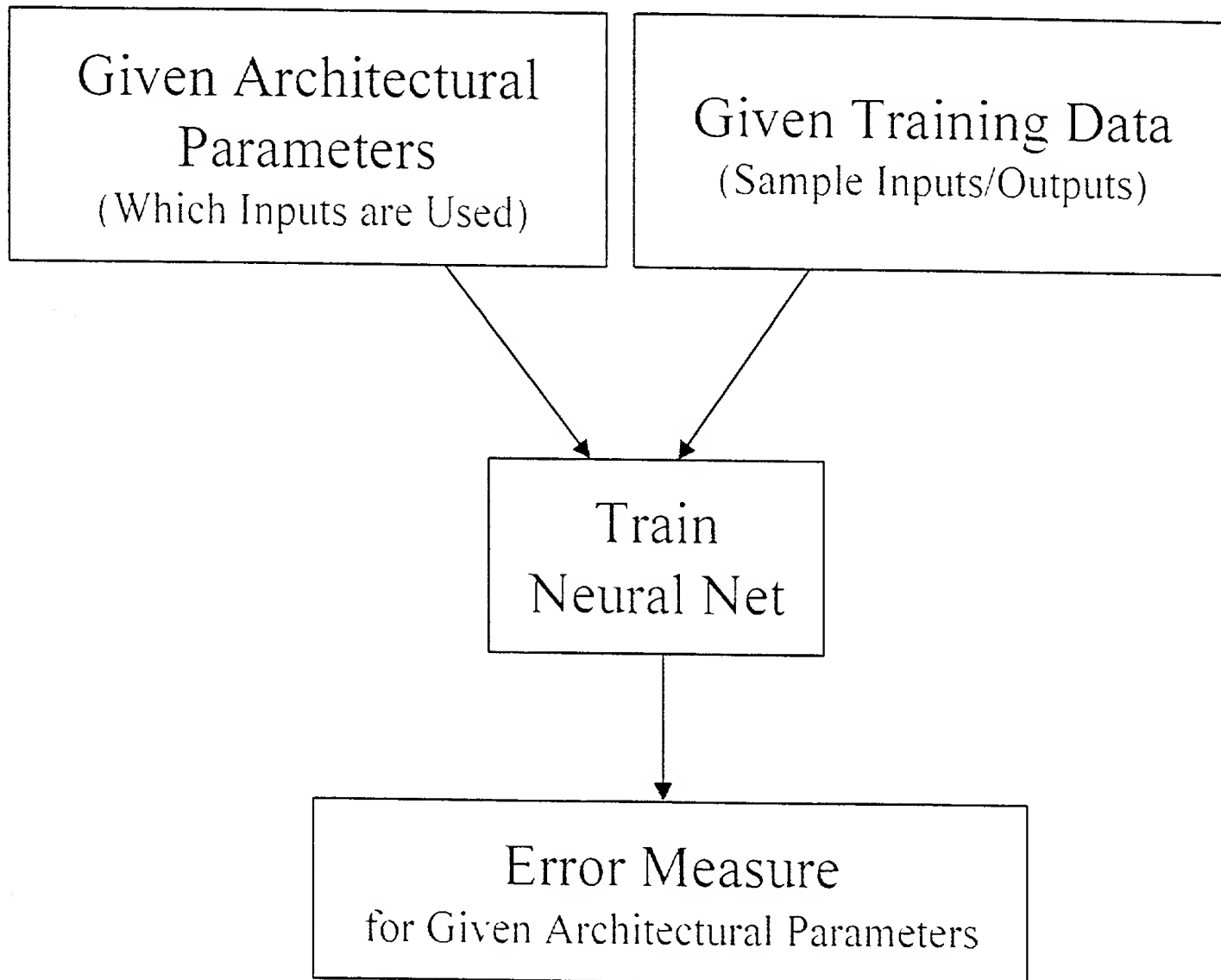


Figure 1D:  
Typical Mapping Neural Network

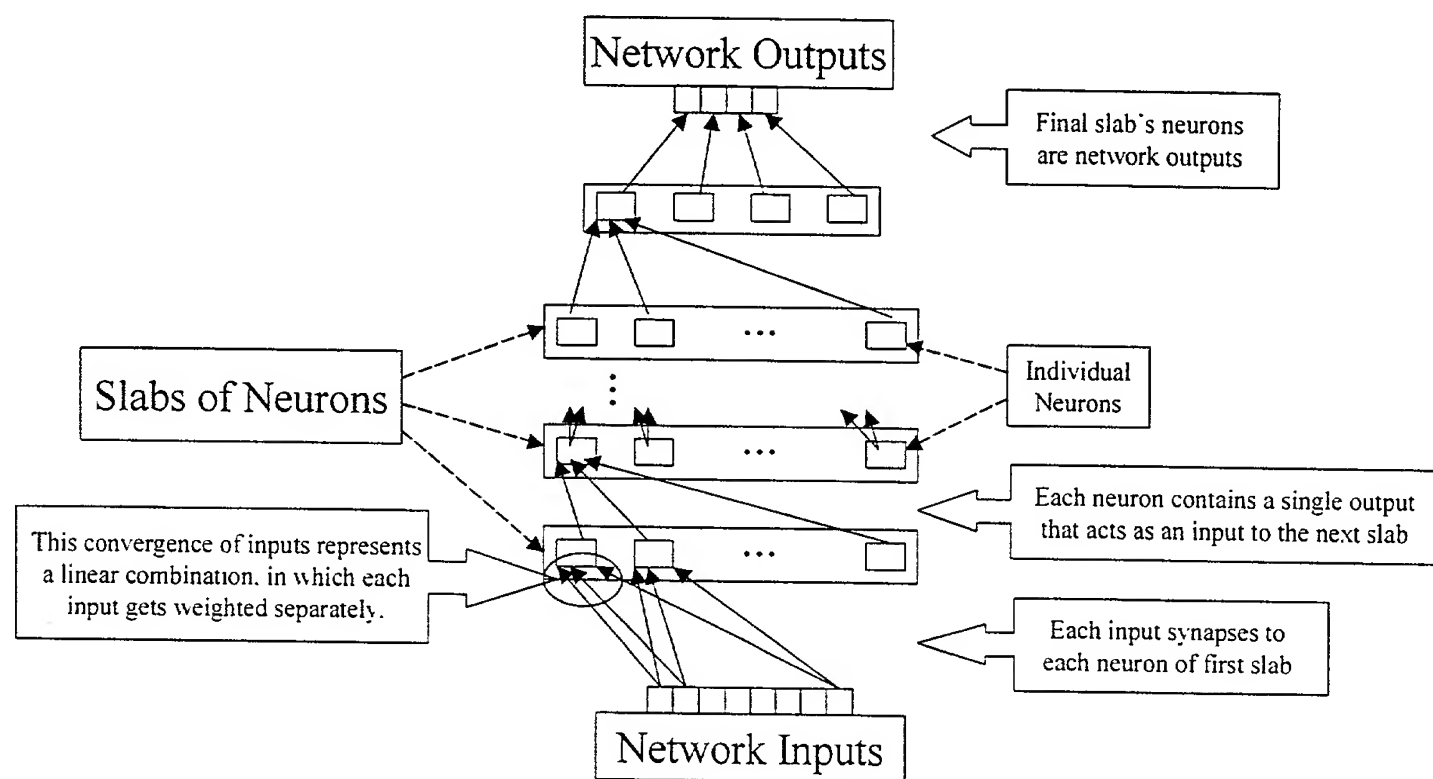


Figure 1E: Typical Genetic Algorithm

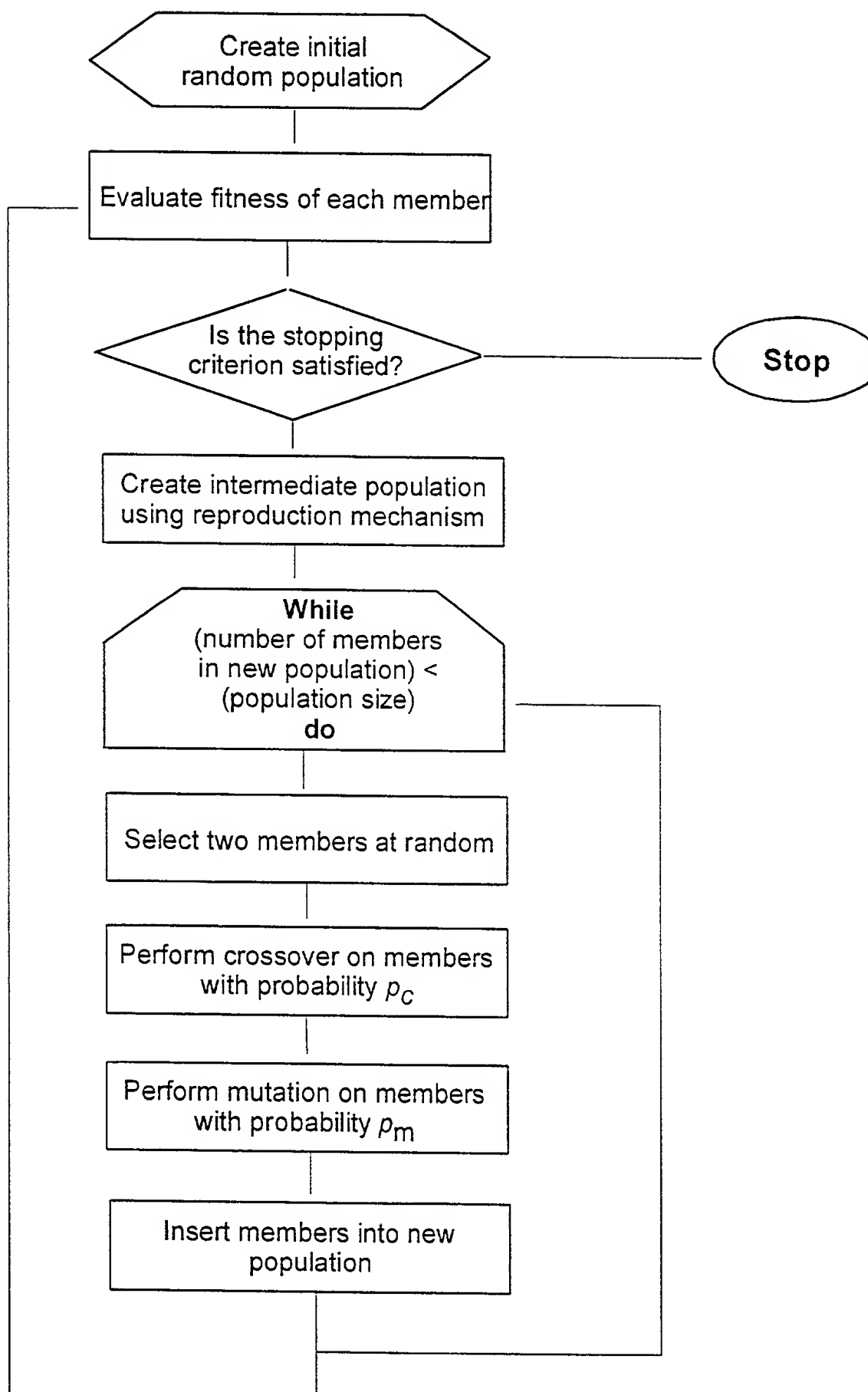


Figure 2  
Method of Predicting Clinical Variables  
Given Genomic Data

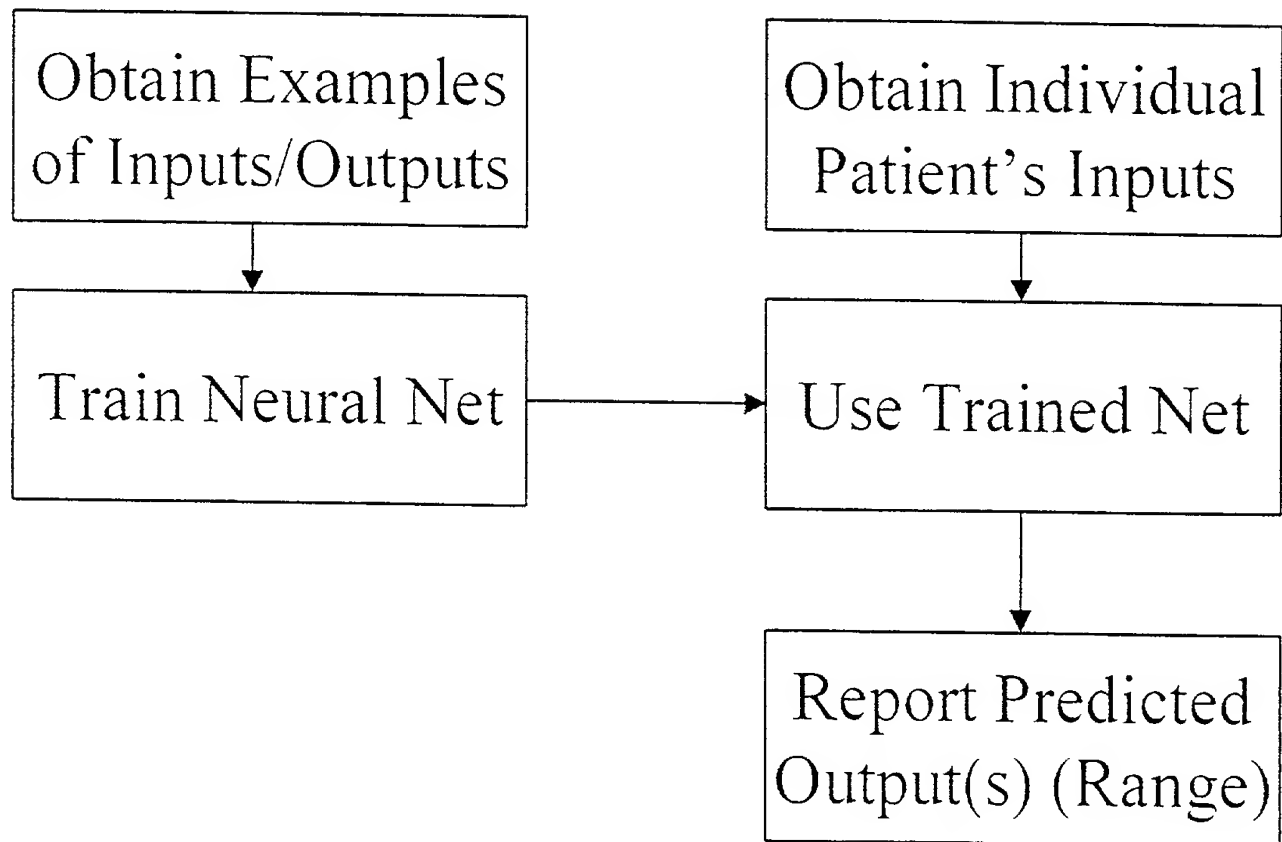


Figure 3  
Genomic Methods of Screening Patients for  
Clinical Drug Use

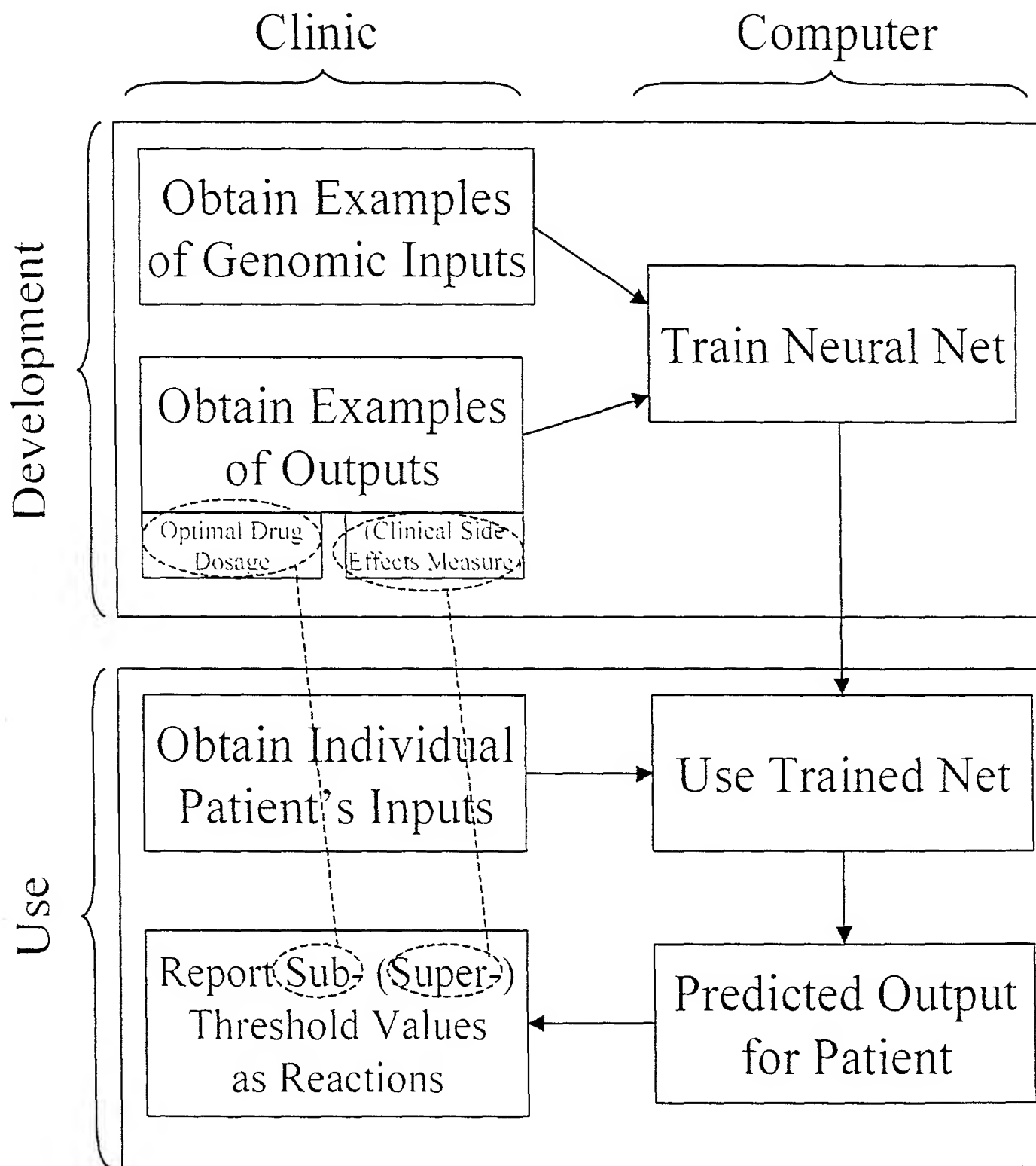


Figure 4A  
GA Rolling: Illustration of Infeasible Initial  
Mapping Problem

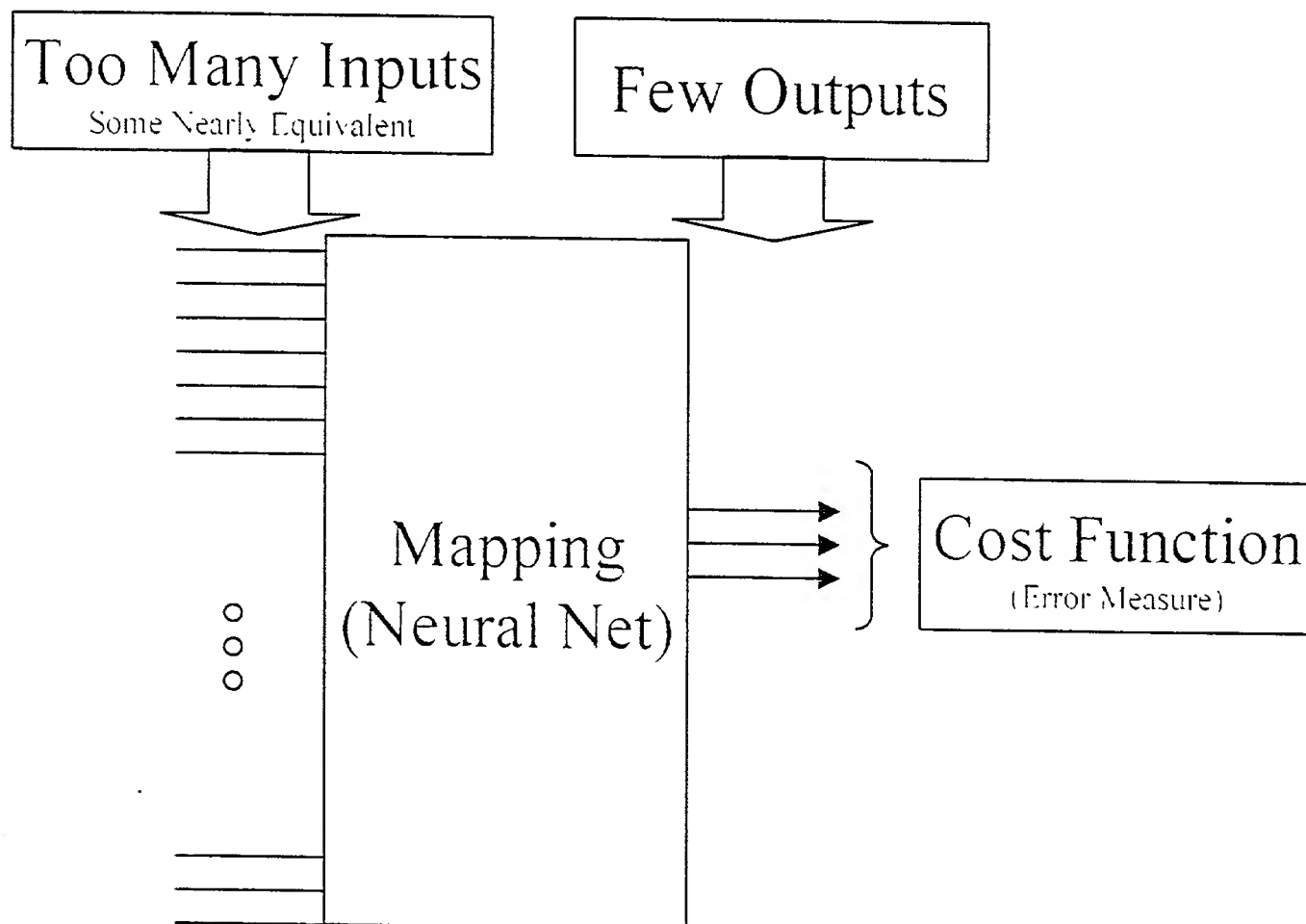




Figure 4B  
GA Rolling: Illustration of Individual  
Category and its Genes

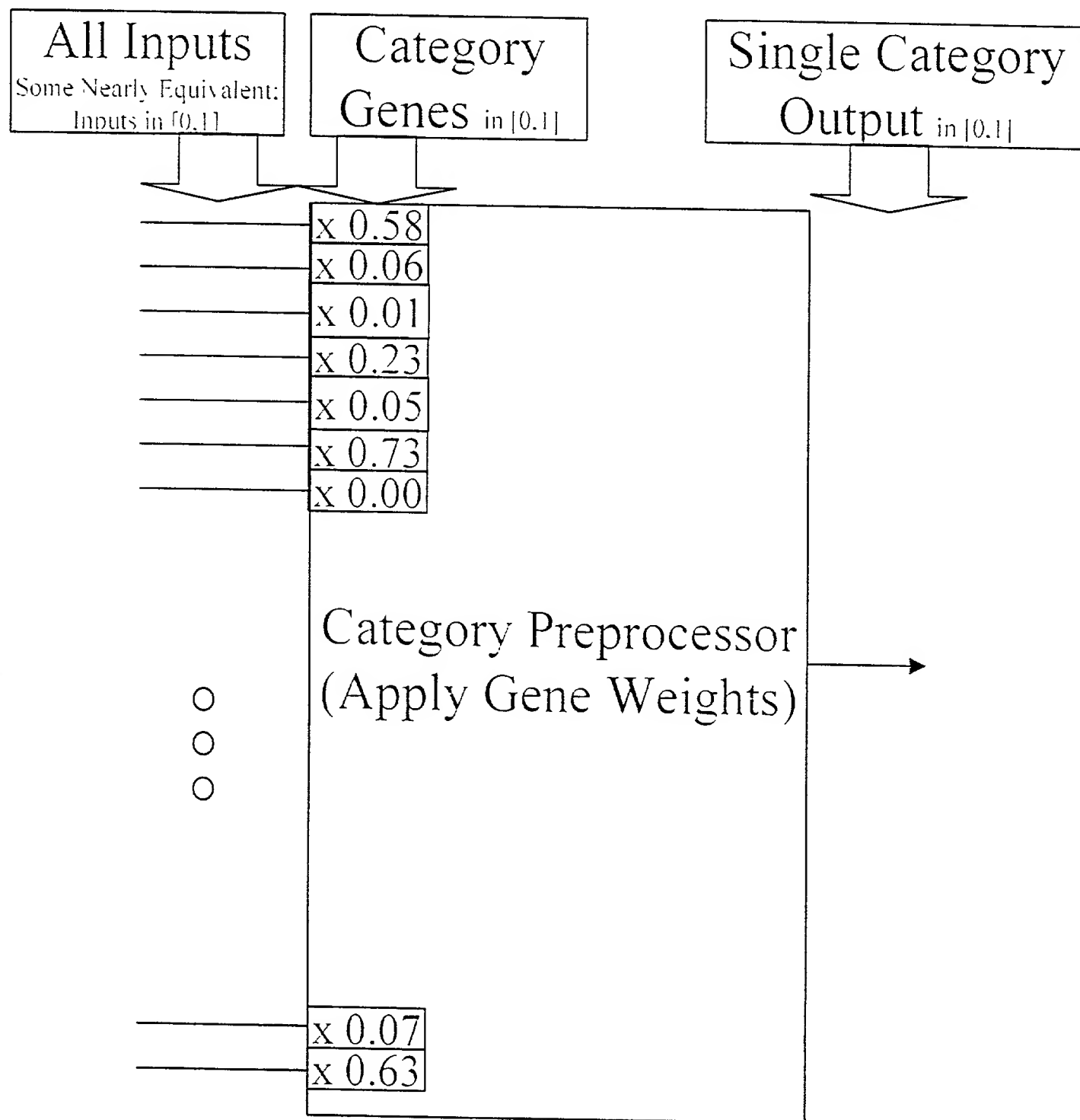


Figure 4C

GA Rolling: Illustration of the Mapping  
Used by the Genetic Algorithm

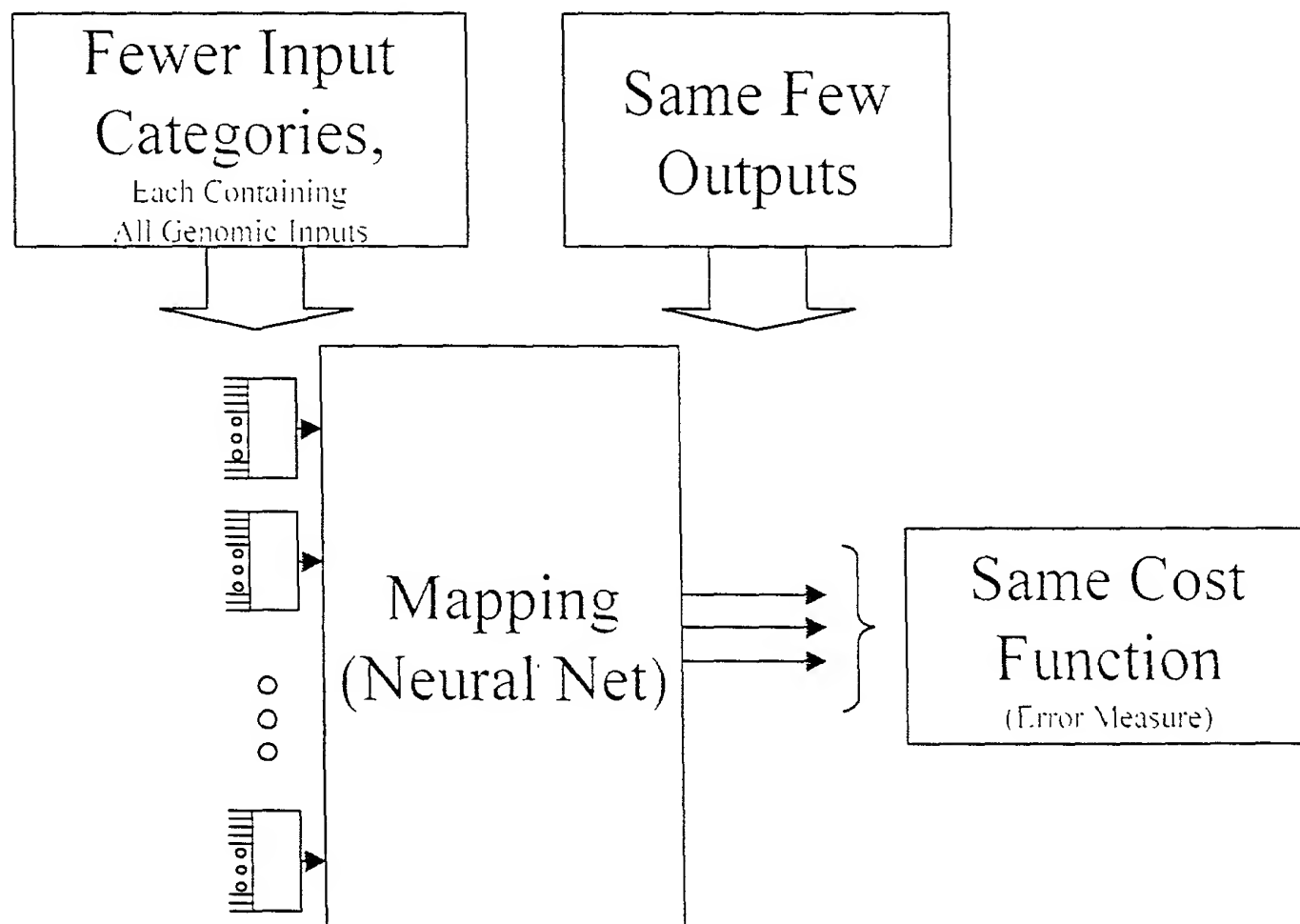


Figure 4D  
GA Rolling: Illustration of the Use of the  
Genetic Algorithm

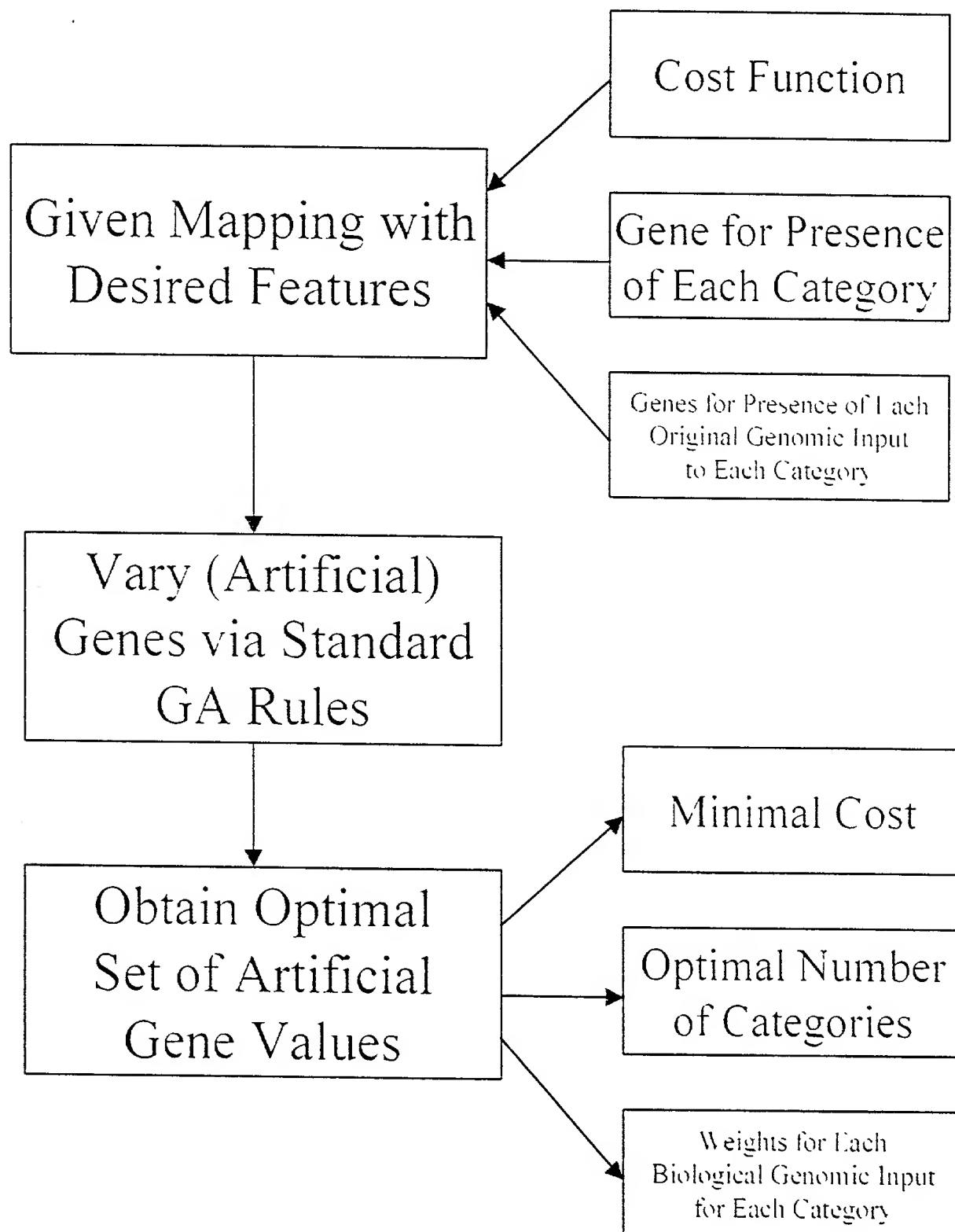


Figure 5A  
Use of Functional Genomic Categorizations for  
Predicting Drug Interactions:  
Preliminary Constructs

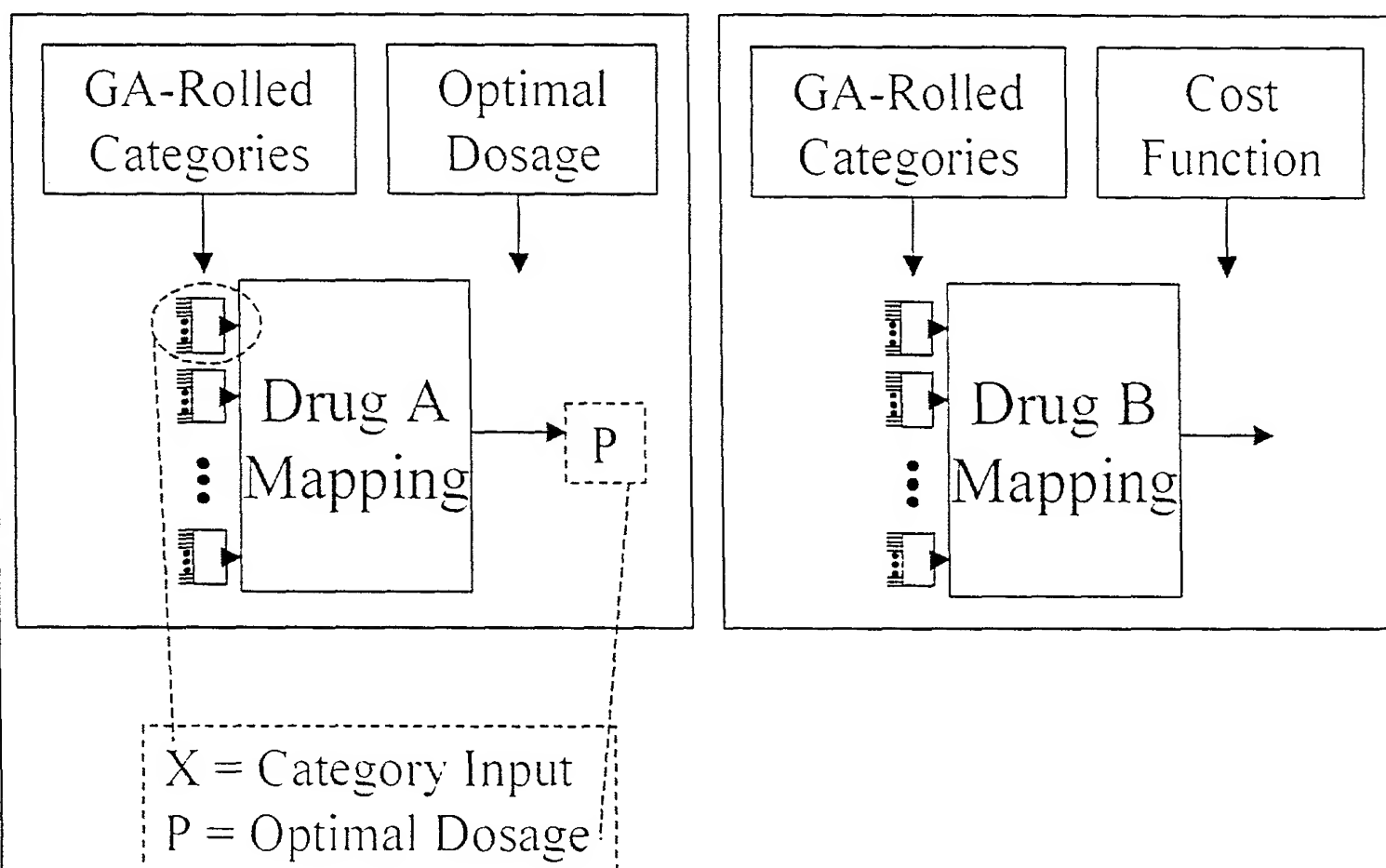


Figure 5B  
Use of Functional Genomic Categorizations for  
Predicting Drug Interactions:  
Intermediate Calculations

“Equivalence” of optimal drug dosage  
and category X:

$$E = -\delta(\ln(P)) / \delta(\ln(X))$$

(Roughly in range [-2,2].)

Estimated equivalent of optimal drug dosage  
in units of category X:

$$\delta X_{\text{drug}} \sim E X_{\text{patient}}$$

$$(\delta X_{\text{drug}} = \text{Integral}(0, X_{\text{patient}}) E(X') dX')$$

Model effect of Drug A on Drug B  
with effectively altered genomic inputs  
(to Cost B mapping):

$$X = X_{\text{patient}} + \delta X_{\text{drug}}$$

Identify corresponding increases in Cost B  
as interactions (of A on B) if cost  
increases > e.g. 30%

Figure 6A  
Universal Functional Genomic Categorization:  
Assembly of Categories

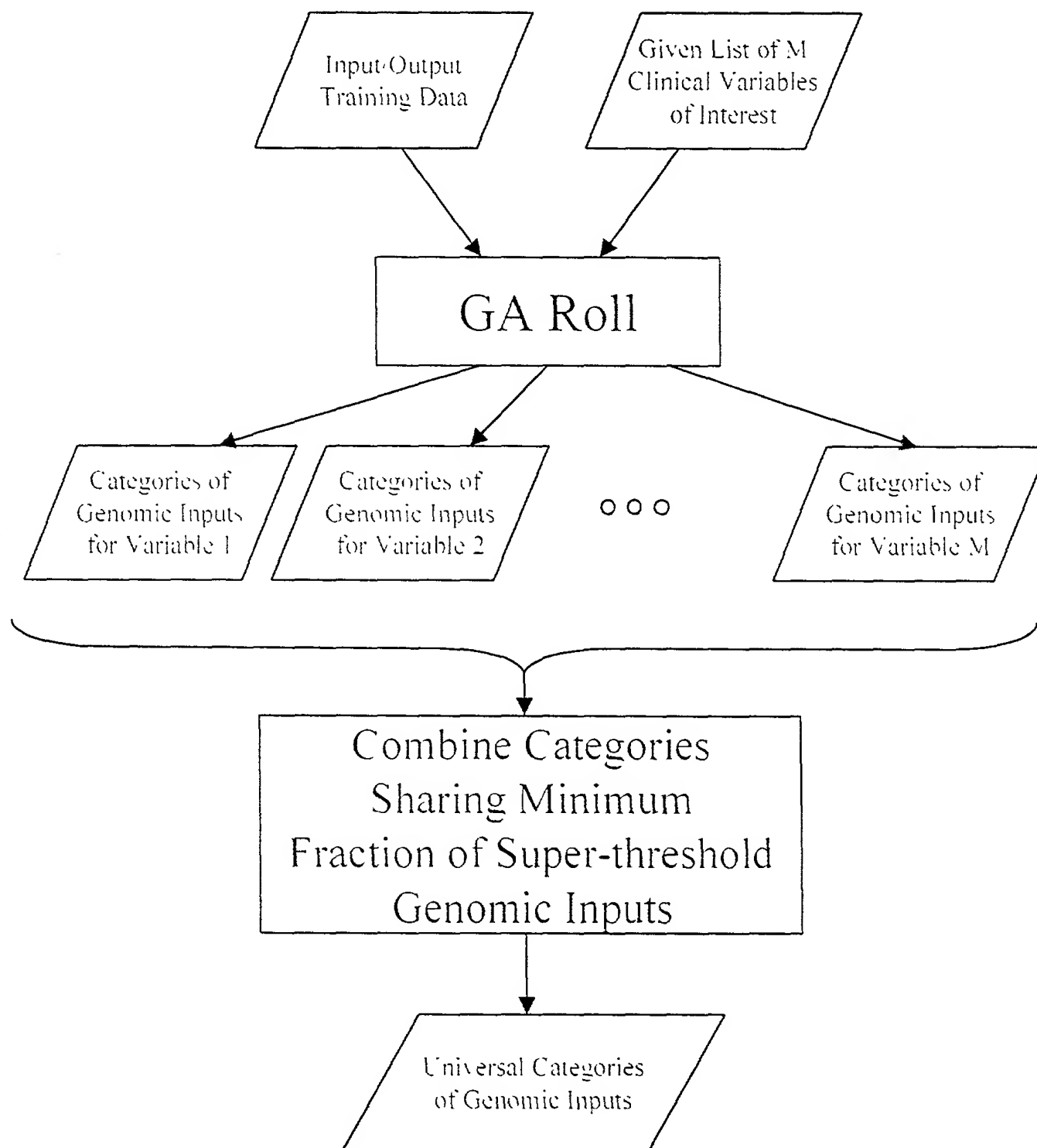


Figure 6B  
 Universal Functional Genomic Categorization:  
 Calculation of Probabilities:  
 Given Information

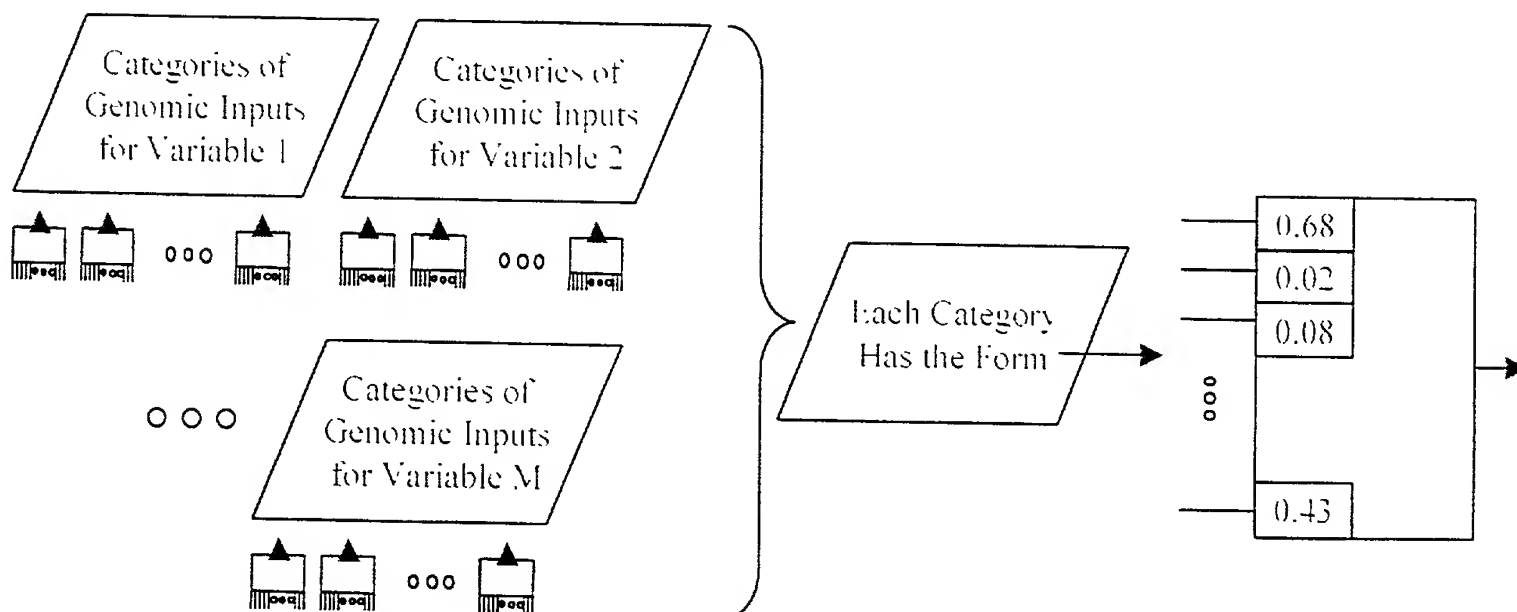
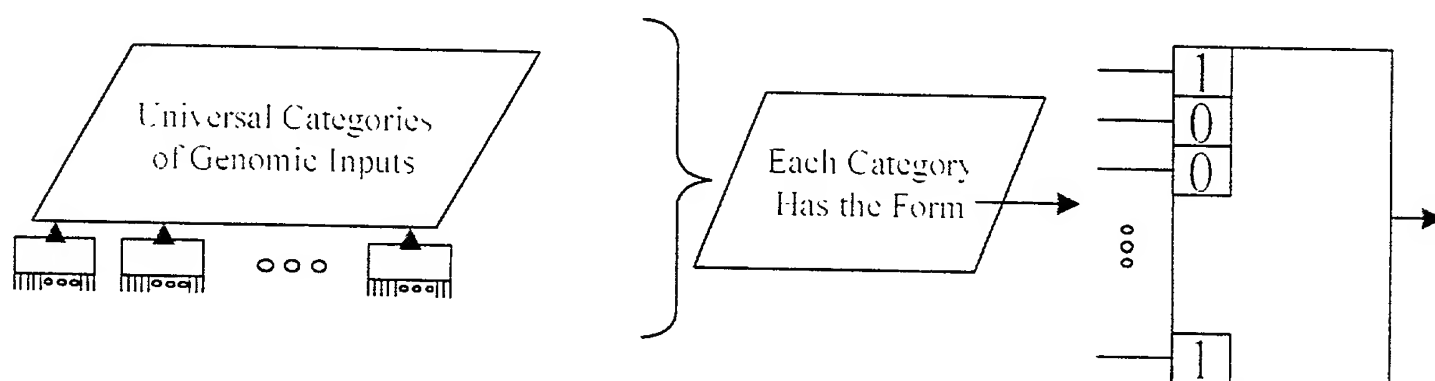
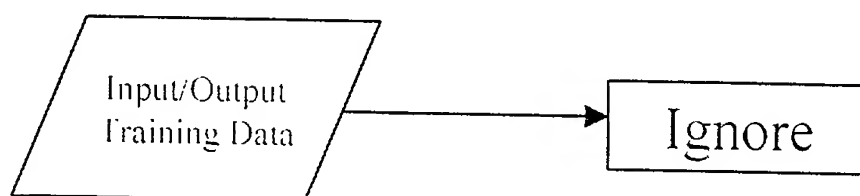


Figure 6C  
 Universal Functional Genomic Categorization:  
 Calculation of Probabilities:  
 Identification of Data

